

EREMOGONE CLIFTONII (CARYOPHYLLACEAE), A NEW SPECIES
FROM CALIFORNIA

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ABSTRACT

Eremogone cliftonii is described as new from northern California. Petal and capsule lengths and presence or not of pubescence or a bloom on vegetative structures are features useful in distinguishing this novelty from *E. aculeata* and *E. kingii* var. *glabrescens*, the congeners found in the region. *Eremogone cliftonii* occurs in open or forested areas on decomposing granite.

Key Words: *Arenaria*, California, Caryophyllaceae, *Eremogone*, North America, Sierra Nevada.

Eremogone is a genus of about 90 species (Hartman and Rabeler 2004; Hartman et al. 2005) known from north-temperate regions from western Europe through Asia and western North America. Fifteen species including this novelty, and numerous varieties, are known in western North America. *Eremogone* plants are woody based, cespitose or matted, perennials with subulate to filiform leaves, erect or ascending flowering stems, and open to congested or umbellate cymes. Although often treated as a subgenus of *Arenaria* (e.g., McNeill 1962), molecular data support *Eremogone* as monophyletic and distinct from *Arenaria* (Nepokroeff et al. 2001)

Eremogone cliftonii Rabeler & R. L. Hartman, sp. nov. —TYPE: USA, California, Plumas Co., in roadside borrow pit, N side of CA 70, 0.5 km E of Chambers Creek, T24N R6E Sec. 3, SE ¼ of SE ¼, 39°57'29"N, 121°17'19"W, 622 m elevation. 20 Apr 2005, R. K. Rabeler 1473 & L. P. Janeway, L. Hanson, L. Ahart (Holotype: MICH; isotypes RM, UC). Fig. 1

Eremogone cliftonii, sp. nov. Herba perennis e caudicem ramis horizontalibus ad ascendentibus. Caules ascendens ad erecti, glabri. Folia filiformia ad aciformia, ascendentia ad arcuati-reflexa, marginibus proximale ciliolatis, apice spinosa. Flores perfecti, regulares, saepe 9–25 in cyma patula; sepala ovata ad obovata, marginibus anguste vel late scariosis, apice plerumque obtusa ad rotundata vel late acuta, saepe apiculata; petala 5, alba, 12–18 mm longa, late patentia, sepalis 2.3–3.7-plo longiora, apice rotundata; antherae 10, vinaceae; styli 3, stigmatibus breve linearibus ad sub-

capitatis. Capsulae cylindrico-urceolatae, 7.5–9 mm longae, primitus dentibus 6 dehiscentes. Semina 5–9, nigra, pyriformi-compressa incisura hylari, tuberculata tuberculis humilibus rotundatis saepe elongatis.

Perennial herb (11)15–35 cm tall arising from a branched woody caudex with horizontal to ascending, often subterranean branches 5–15+ cm long; *Stems* simple or branched, ascending to erect, glabrous, rounded, internodes 0.5–5 mm long; *Leaves* opposite, exstipulate, with dense tufts of closely overlapping leaves at base of fertile stem and on sterile branchlets that are commonly present, cauline leaves more widely spaced, in 2–5 pairs on the main stem, gradually reduced above, filiform to commonly needle-like, mostly 2–6 cm long, 0.7–1.1 mm wide, ascending to widely spreading or arcuate-reflexed, flexuous, often adaxially grooved, especially proximally, the margins ciliolate proximally, the apex spinose; *Inflorescence* a (3) 9–25+ flowered, open cyme; *Pedicels* (5) 10–25 mm, stipitate-glandular; *Flowers* perfect, chasmogamous, regular; *Sepals* ovate, often broadly so (to obovate in inner series), 4.5–5.5 (6.5) mm long, lengthening up to 1 mm in fruit, lustrous, somewhat leathery, glabrous, margins narrowly or broadly scarios (especially inner series, to 0.8 mm wide), 1–3 veined, the lateral veins shorter and less developed, base somewhat thickened, apex usually obtuse to rounded (especially inner series) or broadly acute, often apiculate; *Petals* 5, white, oblong to elliptic, oblanceolate, or obovate, 12–18 mm long, widely spreading, 2.3–3.7 times the length of the sepals, apex rounded; *Anthers* 10, red-violet; *Nectaries* as a lateral and abaxial thickened, crescent-shaped, transverse band with

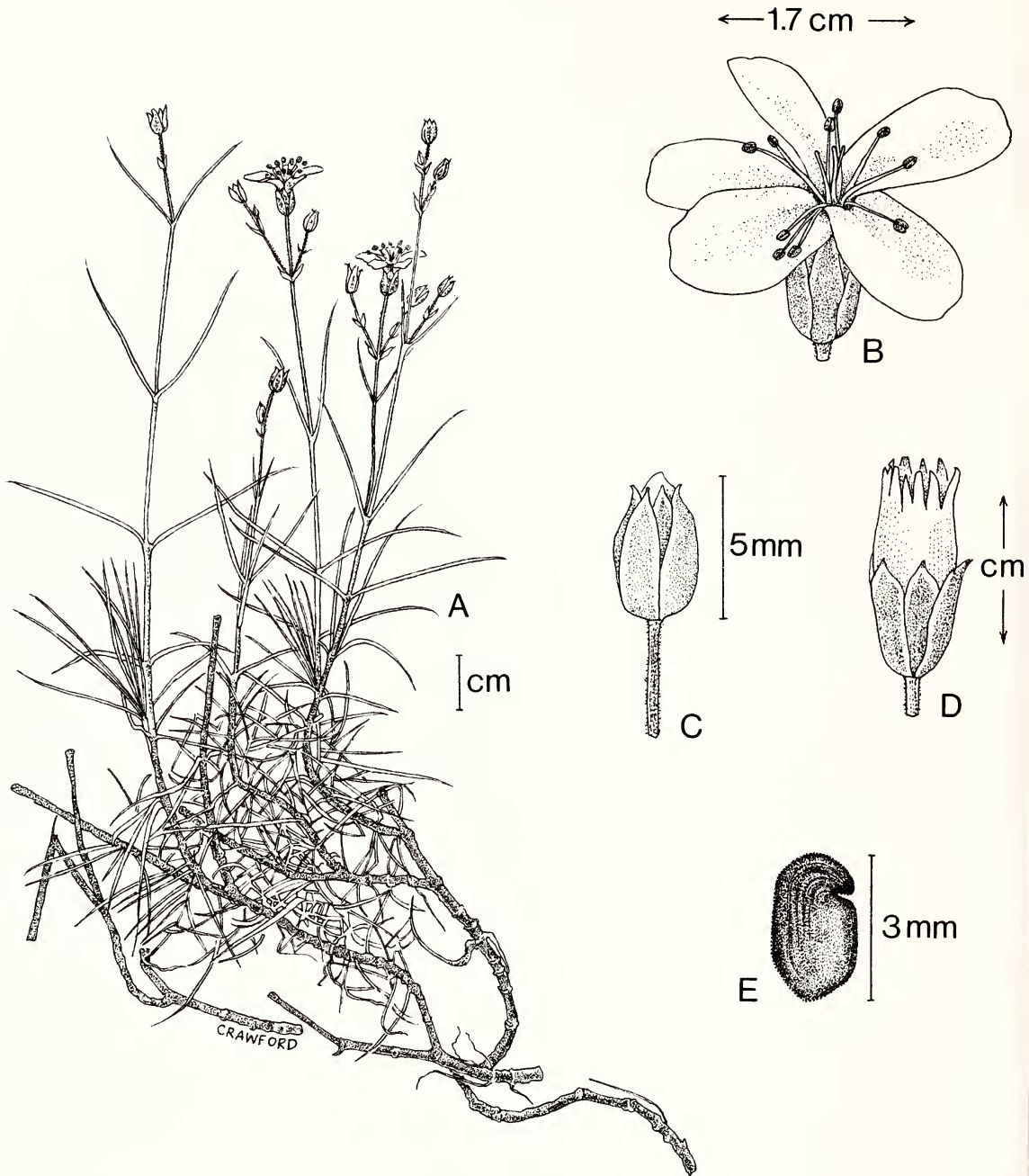


FIG. 1. *Eremogone cliffonii*. A. Habit. B. Flower. C. Bud. D. Dehisced fruit from previous year with subtending sepals. E. Seed. (From Rabaler 1473, MICH)

distal groove at the base of the antisepalous filaments, 0.5–0.6 mm long; *Ovary* 3-carpellate; ovules 5–11; styles 3, distinct, 8–10 mm long; stigmas short-linear to subcapitate; *Capsule* cylindrical-urceolate, 7.5–9 mm long, glabrous, initially opening by 6 teeth dehiscent along the barely discernable sutures, each tooth then splits about half its length; irregular splitting may occur over time; *Seeds* 5–9, black, 2–3 mm long,

pyriform-compressed with a hilar notch, tuberculate throughout, the tubercles low, rounded, short abaxially, elongate on the faces.

The paratypes cited below include all other collections we have examined. Habitat information suggests *E. cliffonii* to be a plant of open (often on slopes of roadcuts) or forested areas on decomposing granite at 455–1770 m elevation. The associated open forest is often a mixture of

ponderosa pine (*Pinus ponderosa* Dougl. ex Lawson & C. Lawson), sugar pine (*Pinus lambertiana* Dougl.), and white fir (*Abies concolor* (Gordon & Glend.) Hildebr.), along with manzanita (*Arctostaphylos* sp.), California black oak (*Quercus kelloggii* Newb.) and canyon live oak (*Quercus chrysolepis* Lieb.). The thirty-one known localities are in an area of about 1467 km² (567 mi²) in Butte and Plumas counties; all are in the Feather River drainage within the Northern High Sierra Nevada subregion of the California Floristic Province (Hickman 1993). Although the geographical range is small, the plants are sometimes abundant; one label noted "about 400 plants" (Hillaire 1216), while another noted "about 800 plants" (Hillaire 1225).

Eremogone cliftonii is named for Glenn Clifton who, as part of his extensive collections towards a flora of Plumas County and the Plumas National Forest (Clifton 2003), recognized *E. cliftonii* as new (proposing the name "Arenaria grandiflora" without a Latin diagnosis, which would be a later homonym of *A. grandiflora* L., a European species). Apparently it was first collected in 1915 by A. A. Heller, then infrequently by several botanists until the 1980s when affiliates of the Chico State University herbarium documented it several times. Michael Baad apparently did not encounter it while doing field work for his dissertation on *Arenaria* subg. *Eremogone* (Baad 1969). Our first encounter with *E. cliftonii* was during preparation of the treatment of *Eremogone* for Flora of North America (Hartman et al. 2005). Barbara Ertter (UC) had sent Hartman several inflorescences of a plant gathered in the Feather River Canyon that she had been given to identify for use in a display at a flower show in Oakland, California. After seeing the large flowers, we immediately judged it unique not only among California material, but a new taxon, thus additional field and herbarium exploration was warranted. Lawrence Janeway (CHSC) and Linnea Hanson (U.S. Forest Service) were contacted. This led to surveys on the Plumas National Forest during 2005 and 2006 and the gathering of over one-third of the collections cited.

Most collections of *Eremogone cliftonii* that had been named were identified as *A. aculeata* S. Wats. (*E. aculeata* (S. Wats.) Ikonn.), *Arenaria macradenia* S. Watson subsp. *ferrisiae* Abrams (*E. ferrisiae* (Abrams) R. L. Hartm. & Rabeler), or simply identified to genus. Apparently selected specimens of Heller 12071 (NY, UC, with few flowers with shriveled petals, mostly fruit; WTU, in late fruit) was the only collection seen by Baad. He annotated it as *A. aculeata*, as did Hartman while preparing a treatment for the Jepson Manual (UC only; Hartman 1993). Likewise, Hickman appears to have encountered the novelty but once during his study of *Arenaria*

sect. *Eremogone* (Hickman 1971). He annotated Balls & Lenz 20700 (DS, in full flower) as "a unique individual: seems to have some characters of *Arenaria pumicola californica* and *Arenaria macradenia*." Study subsequent to our FNA work has revealed that *Arenaria pumicola* Coville & Leiburg var. *californica* Maguire is more appropriately considered a synonym of *E. kingii* var. *glabrescens* (S. Watson) Dorn; *A. macradenia* would refer to material we now segregate as *E. ferrisiae* (Hartman et al. 2005). In comparing *E. ferrisiae* with *E. cliftonii* (character states of the latter in parentheses): sepals acute to acuminate, sometimes + spine-tipped (generally obtuse to rounded or broadly acute, sometimes abruptly pointed), 3–4.3 (4.5–6.5) mm long, to 5.5 (7.5) mm long in fruit; petals 6–9 (12–18) mm long, and nectary glands 0.3–0.4 (0.5–0.6) mm long). Furthermore, *E. ferrisiae* is restricted to Mono, Inyo, and Tulare counties and a few sites further south in California. While both *E. aculeata* and *E. cliftonii* can be found in the northern Sierra, along with the frequently encountered *E. kingii* var. *glabrescens*, they can be distinguished as follows:

KEY TO *EREMOGONE CLIFTONII* AND CONGENERS IN THE REGION

1. Sepals generally obtuse to rounded or broadly acute, sometimes abruptly pointed
 2. Petals 4.5–10 mm long, ca. 1.2–1.3 times sepal length; stems glandular-hairy; leaves usually glaucous; capsules 5–7 mm long. *E. aculeata*
 2. Petals 12–18 mm long, 2.3–3.7 times sepals length; stems glabrous; leaves not glaucous; capsules 7.5–9 mm long *E. cliftonii*
1. Sepals acute to acuminate, sometimes ± spine-tipped *E. kingii* var. *glabrescens*

Paratypes. USA, California, **Butte County**: T25N R5E Sec. 21, 5000 ft. elev., 30 Jun 1962, F.V. Brunett 110 (MICH); ca. 2 km SW of intersection of North Fork, Feather River and Plumas Co., T23N R5E Sec. 11, 490 m elev., 22 Jun 1977, J. P. Warner 1 (CHSC); North Fork Feather River, 1.3 mi NE of Poe Power Dam, T23N R5E Sec 28, 1840 ft elev., 12 May 1980, R. Banchemo & R. A. Schlising 3588 (CHSC); 2.5 mi SE of Mountain House, [T22N R6E Sec. 33], 1100 m elev., 29 May 1980, L. Ahart 2362 (CHSC, DAV); ca. 3 mi NE of Milsap Bar, [T22N R7E Sec. 31], 1100 m elev., 10 Sep 1980, L. Ahart 2636 (CHSC); S end of Walker Plains, T22N R6E Sec. 4, 5040 ft elev., 11 Jul 1980, R. Schlising 3882 (CHSC); ca. 0.5 mi N of Mayaro, T23N R5E Sec. 21, 2000 ft elev., 21 May 1981, M. S. Taylor 3793 (CAS [2], MO); 0.5 mi N of Ramsey Bar on Little Kimshew Creek, T24N R5E Sec. 20, 4650 ft elev., 29 Jun 1981, R. Banchemo & R. A. Schlising 4124 (CHSC); 0.8 mi SW of Ramsey Bar on Little Kimshew Creek,

T24N R5E Sec. 29, 4800 ft elev., 29 Jun 1981, *R. Banchemo & R. Schlising* 4125 (CHSC); N end Concow area N of Flea Mt., T23N R5E Sec. 19, 3650 ft elev., 23 Jun 1982, *R. E. Preston, R. Banchemo, & R. A. Schlising* 4300 (CHSC); 2 mi E of Milsap Bar, T22N R7E Sec. 31, 900 m elev., 29 Jul 1983, *L. Ahart 4246* (CHSC, MICH, MO); along long sharp switchback in county rd 66553, T23N R5E Sec. 21, 2500 ft elev., 10 Sep 1984, *L.P. Janeway s.n. & R. Harrison, G. Benson* (CHSC); Feather River SE of Mayaro, T23N R5E Sec. 28, 1500 ft elev., 21 Apr 1985, *V. Oswald 1713* (CHSC); above hwy. 70, 3.1 mi NE of Pulga bridge, T23N R5E Sec. 28, 1559 ft elev., 20 May 1987, *L. P. Janeway 2082* (CHSC); side road (23N12Y) 0.6 mi from Four Trees Road, T23N R6E Sec. 32, 4800 ft elev., 28 May 1987, *L. P. Janeway 2111* (CHSC); 2.5 mi E of Granite Ridge along road to Lynch and Logue Meadows, T24N R5E Sec. 32, 4480 ft elev., 26 Jun 1987, *L. P. Janeway 2307* (CHSC); along Concow Road, 3.6 mi N of Rag Dump, T24N R5E Sec. 31, 4500 ft elev., 20 Jun 1994, *L. P. Janeway 4669* (CHSC, RSA); Hwy 70, south side of canyon of North Fork Feather River, T23N R5E Sec. 27, 455 m elev., 28 May 2000, *L. P. Janeway & B. Castro 6745* (CHSC); 100 m W of the western driveway to Cresta Powerhouse, T23N R5E Sec. 27, 455 m elev., 20 Apr 2005, *R.K. Rabeler 1472 & L. P. Janeway, L. Hanson, L. Ahart* (CAS, GH, MICH, RM); 29 Jun 2005, *L. P. Janeway 8444 & L. Hanson* (CHSC, MICH); 3 Aug 2006, *R.K. Rabeler 1479 & J.A. Macklin* (GH, MICH, RM); along Pulga road on SW side of Dogwood Creek, T23N R5E Sec. 29, 594 m, 4 May 2005, *L. P. Janeway 8376 & M. Brown, S. Hillaire, J. Tuitele-Lewis* (CHSC); Pulga Road ca. 1.2 km E of Camp Creek, T23N R5E Sec. 21, 747 m elev., 4 May 2005, *L. P. Janeway 8377 & S. Hillaire, M. Brown, J. Tuitele-Lewis* (CHSC); just above Road 23N02, 0.2 km N of county road 66553, T23N R5E Sec. 20, 1073 m elev., 4 May 2005; *L. P. Janeway 8378 & M. Brown, S. Hillaire, J. Tuitele-Lewis* (CHSC); N of Pulga/Mayaro area, T23N R5E Sec. 20, 3340 ft elev., 4 May 2005, *S.M. Hillaire 1216 & M. Brown, L. P. Janeway, J. Lewis* (CHSC, RM); 0.7 km E of Lockerman Creek and 1.2 km ENE of its confluence at Camp Creek, T23N R5E Sec. 9, 1234 m elev., 11 May 2005, *L. P. Janeway 8388 & C. Christofferson, S. Hillaire, M. Brown, J. Tuitele-Lewis* (CHSC); 1.3 km NE of Flea Mountain, T23N R5E Sec. 19, 1152 m elev., 25 May 2005, *L. P. Janeway 8396 & M. Brown, J. Tuitele-Lewis* (CHSC); top of S end of Granite Ridge, about 2.3 km S of Kimshe Point, T23N R5E Sec. 6, 1317 m elev., 29 May 2005, *L. P. Janeway 8404* (CHSC, MICH); 0.2 km NW of Concow Road at the gap between the head of Rock Creek and the Little Kimshe Point drainage, T24N R5E Sec. 29, 1478 m elev., 29 May 2005, *L. P. Janeway*

8410 (CHSC, MICH); along road 22N62, S of Middle Fork Feather River, T22N R7E Sec. 31, 3120 ft elev., 10 Jun 2005, *S.M. Hillaire 1217 & M. Brown* (CHSC, RM); 2820 ft elev., 10 Jun 2005, *S.M. Hillaire 1218 & M. Brown* (CHSC); near Four Trees Road, T23N R6E Sec. 33, 4780 ft elev., 20 Jun 2005, *S.M. Hillaire 1224 & M. Brown* (CHSC, RM); N of Pulga, near Lockermans Creek, [T23N R5E Sec. 9], 3700 ft elev., 21 Jun 2005, *S.M. Hillaire 1223 & B. Castro* (CHSC, RM); 0.3 km W of Cedar Creek and 2.6 km NNW of mouth of Cedar Creek at North Fork Feather River, T23N R5E Sec. 9, 1295 m elev., 26 Jun 2005, *L. P. Janeway 8436* (CHSC, MICH);

Plumas County: Soapstone Ridge (Hill), 12 mi W of Bucks [Lake], [T23N R6E, Sec 15], 5500 ft elev., 7 Jul 1915, *A.A. Heller 12071* (BKL, CAS, DS, F, NY, UC, US, WTU); Camp Rogers [T24N R6E Sec 2], 2800 ft elev., 6 Jun 1920, *A. Head s.n.* (CAS); U.S. Hwy. 40 alt. (CA Hwy. 70), between Tobin and Camp Rogers, 13 May 1955, *E.K. Balls & L.W. Lenz 20700* (DS, RSA); Rodgers Flat, [T24N R6E Sec 2], 1967, *L. Rose 69075* (CAS); near Rodgers Flat bridge, [T24N R6E Sec 2], 2000 ft elev., 23 Jun 1967, *J.T. Howell 42741* (CAS, MICH, MO); near mouth of Chambers Creek [T24N R6E S3], ca. 2000 ft elev., 9 May 1967, *J.T. Howell & G.H. True 42224* (CAS); "Buck's Lake", T24N R6E Sec. 25 [TRS is west of Bucks Lake], 8 Jul 1975, *F. T. Griggs 120 & A. Pass* (CHSC); 9 Jul 1975, *D. Brink & L. Mayer s.n.* (CHSC); T24N R6E Sec 25, 12 Jul 1975, *F.T. Griggs & A. Pass 172* (CHSC); between Storrie and Belden, ca 2000 ft elev., 18 May 1976, *G.L. Smith s.n.* (CAS); between Indian Joe and Caribou [probably near Injun Jim Campground; T24N R6E Sec 9–10], 2000 ft elev., 17 Apr 1978, *C.B. Hardham 21583* (CAS, RSA); E side of Oroville-Quincy hwy at Walker Plains, T23N R6E Sec. 33, 5000 ft elev., 14 May 1981, *M. S. Taylor 3723* (MO); about 1.5 mi W of Sawmill Flat, T23N R9E Sec. 33, 5800 ft elev., 25 Jul 1986, *L. Ahart 5378* (CHSC); ca. 0.5 mi W of Little Marble Cone, T22N R7E Sec. 19, 30, 4800 ft elev., 3 Jul 1995, *B. Castro 579* (CHSC); sandy cut, Hwy 70, 2160 ft. elev., 26 Apr 1996, *G. Clifton 34250* (G. Clifton herb); along hwy. 70, 0.5 mi E of Chambers Creek [T24N R6E Sec. 3], [622 m elev.], 9 Apr 1997, *D. W. Taylor 15947* (JEPS, UC); 17 Apr 1997, *G. Clifton 35331* (G. Clifton herb, not seen [cited in Clifton 2003]); 29 Jun 2005 *L.P. Janeway 8445 & L. Hanson* (CHSC, MICH); 3 Aug 2006, *R.K. Rabeler 1478 & J.A. Macklin* (CAS, GH, MICH, RM, RSA); near Lower Buck's Lake, T24N R6E Sec. 26, 5000 ft elev., 20 Jun 2005, *S.M. Hillaire 1225 & M. Brown* (CHSC, RM); above road 24N36, near Lower Buck's Lake, T24N R6E Sec. 26, 5000 ft elev., 20 Jun 2005, *S.M. Hillaire 1226 & M. Brown* (CHSC, RM); above road 24N04,

0.3 km S of crossing of North Valley Creek, T24N R5E, Sec. 23, 1347 m elev., 26 Jun 2005, *L. P. Janeway 8441* (CHSC, MICH); 4 Sep 2005, *L. P. Janeway 8536* (CHSC, MICH).

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